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AUTHOR Bates, A. W.
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ABSTRACT

This paper describes how audiovisual media have influenced the way students have learned--or failed to learn--at the Open University at Walton Hall. The paper is based in part on results from a large body of research that has repeatedly demonstrated the interrelatedness of a wide range of factors in determining how or what students learn from audiovisual media. For instance, the administration's policy toward the assessment of broadcast material will affect not only the way many students approach the programs, but may determine whether or not a student will watch at all; the benefit a student obtains from a program will be affected by how much he has read in the correspondence texts; and that in turn will be influenced by the timing of the TMAs (tutor marked assignments). Primarily a literature review, this paper discusses the following topics: general theory and research relevant to the Open University; the roles of audiovisual media in Open University learning; case studies and documentaries; television as reinforcement; delivery of instruction; students' prior experience with learning from television and radio; student control over audiovisual media; relevance of program material; individual differences; and the need for broadcast notes. An extensive bibliography is included. (THC)

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LEARNING FROM AUDIO-VISUAL MEDIA:

THE OPEN UNIVERSITY EXPERIENCE

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Dr A. W. Bates,
Audio-Visual Media Research Group,
Institute of Educational Technology,
Open University,
Walton Hall.

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A Framework for Understanding Learning from Audio-Visual Media

I want to show how decisions made by individual academics and producers, by course teams, and by University and BBC management, have influenced the way students have learned - or failed to learn - from audio-visual media at the Open University. These conclusions are based on results from over 30 major research studies of Open University audio-visual media carried out over the last eight years, mainly, but not entirely, by IET's Audio-Visual Media Research Group.

However, it is first necessary to place these results within a more general framework of student learning at the Open University. Firstly, television, radio, and cassettes form only a part of a student's course. Thus any research into learning from different media must as far as possible be placed in the full context of a student's learning experience. Also, learning from media in the Open University is affected by a wide variety of factors, and these factors tend to be inter-related. For instance the course team's policy towards the assessment of broadcast material will affect not only the way many students will approach the programmes, but may determine whether or not a student will watch at all; the benefit a student obtains from a programme will be affected by how far he has got in the reading of the correspondence texts; and that in turn will be influenced by the timing of the TMA's.

The research has shown over and over again the inter-relatedness of a wide range of factors determining how or what students learn from audio-visual media (see Bates, 1980 for a full description of the variables influencing learning from Open University television). While this inter-relatedness will come as no surprise, it means that the research results need to be described and interpreted very carefully.

I am anxious to present the results from what is in effect a large body of research in the way most helpful to course designers and University planners, and to do this, I shall try and link the research to areas of decision-making. However, the inter-relatedness of the many factors which influence student learning from different media makes a "sequential" or "linear" presentation of results difficult and indeed misleading. Such a presentation could suggest an obstacle race, a set of hurdles to clear, before learning from media can take place. It is certainly true that there are some conditions which are more important than others in influencing student learning. After all, if a student cannot or will not see a programme because of the time at which it is transmitted, he is not going to learn from it, no matter how well

it may have been made. However, learners are generally highly adaptive. The success or otherwise of a programme rarely depends on any one single factor - provided the student watches a programme, he may gain benefit from even a poorly produced programme, if other conditions are right.

In such circumstances, it would be foolish to try and lay down rules or guidelines on the basis of the research. I have therefore tried to present the results in a way which will lead to greater understanding of how students learn from media or in a way which will provide some insight into student behaviour. The nature of the learning process, however, requires individual readers to make their own judgement about how best to use such information, in the context of their own courses.

General Theory and Research Relevant to the Open University

Because of the contextual nature of learning, there is surprisingly little research or theory from outside the University which appears directly relevant to our needs. Much of the largely American laboratory-type research on educational media has looked at media in isolation from the students' general learning context, (see Bates, 1981, for a critique of this kind of research).

However, in recent years, a general theory of learning from media has begun to be developed, which has been based on research into the unique characteristics of each medium, and has tried to answer the question: "What do students learn from television (or radio, etc.,) that cannot be learned from other media?"

To answer that question, one must look at the role that media play in teaching. A medium is one way through which knowledge can be represented - it is a window on the world. Knowledge of the same topic or concept though can be represented in many ways: verbally, numerically, physically, conceptually, symbolically. Thus the experience of "heat" can be represented by words ("it is hot"), by numbers ($110^{o}F$), physically by touch (feeling the heat), by concept ("form of energy arising from random motion of molecules of bodies"), or symbolically (a man dragging himself through the desert).

Each way of "knowing" heat is different. Eventually though the learner must relate all these experiences together to fully understand the idea or "concept" of "heat". Teaching aims at finding suitable means of conveying or representing knowledge and skills to learners. Television may be one of those means. Thus television may provide a different way of knowing

about a concept from being told about it or experiencing it. Teaching though is about more than just presenting or representing knowledge of the world in a variety of ways. It is also about using that knowledge.

Olson and Bruner (1974) have used this distinction between acquiring and using knowledge to argue that knowledge (or content) is invariant across media, but mental skills are more dependent on the right choice of medium for their development. Thus learners can acquire facts, ideas, principles, opinions, relationships from any medium, whereas skills such as observation, analysis, problem solving are developed better by some media rather than others.

A refinement of this hypothesis is Salamon's proposition (1979) that the symbol systems unique to different media do not facilitate learning in a simple, unidimensional manner, but can facilitate learning in one of three ways:

(a) by activating already existing mental skills, through providing practice in their use;

(b) by short-circuiting difficult mental processes, through symbol systems representing knowledge in a new way;

(c) by supplanting or modelling the mental elaborations required - i.e. demonstrating to learners how to move from point A to point B - to incorporate new knowledge.

Salomon also argues that if learners are already familiar or knowledgeable in a specific area, their response to the use of different media will be different than if the knowledge to be learned is new. If learners are already familiar with the subject area, choice of medium will be less important for knowledge acquisition. However, the more the medium presents knowledge which differs from the learner's already existing knowledge base, the more mental effort or elaboration will be required to incorporate that knowledge. In such circumstances, it will matter how well the medium is matched to the learning task.

He goes on to argue that where media enable difficult mental processes to be short circuited, knowledge acquisition is speeded up, but mental skills are not developed. Modelling on the other hand will develop mental skills, if these do not exist or are not well-developed, but modelling will actually

interfere with learning if the learner is already knowledgeable in the area.

I have considerable reservations about these hypotheses (see Bates, 1981c for a full critique), but they are useful in bringing to attention the nature of learning through media, and there is some support for such hypotheses from the Open University's own experience. For instance, although it may not always be conscious policy, in Open University courses the same content is usually dealt with in different media, but different approaches or ways of dealing with that common content is found in each medium, resulting in students processing or using that knowledge in different ways.

Thus a medium has <u>two</u> functions in the learning process:

(a) the presentation of knowledge in a different way from the presentation of the same knowledge through another medium, thus providing a broader base of "knowing" - knowing "what" in different ways;

(b) the development of certain mental skills in <u>using</u> knowledge - knowing "how" in different ways.

If such a theory has a strong empirical base (and this has yet to be demonstrated), it is necessary for teachers and producers to identify clearly those skills which are most suited to development through particular media. I hope to show that some of our research can be seen as identifying some such skills.

What Roles Do Audio-Visual Media Play in Open University Learning?

The University has, over the past 12 years, jointly produced with the BBC over 3000 television programmes and a similar number of radio programmes, plus over 500 cassettes and 100 records. The range and variety of output has been enormous. It could be argued that each programme is a unique "event". Any attempt at classification is extremely difficult.

With such a wide range of possible uses the AVMRG has had to concentrate its more detailed research into student learning on specific examples of programme types or functions which are commonly used in the Open University, or represent possibly major new developments in the use of audio-visual media. Specifically, we have looked at <u>television</u> used for the following purposes:

- the presentation of abstract mathematical concepts through silent animation, (231 - Ahrens et al., 1975);

- the construction of physical models to represent abstract ideas (T291 - Bates, 1975a);

- the illustration through a location visit, of industrial applications of chemical processes (S24 - Gallagher, 1975a);

- the use of dramatisation for enriching students' interpretation of a novel (A302 - Brown and Gallagher, 1978);

- the reinforcement of techniques and concepts dealt with in other components (S333 - Berrigan, 1976; D101 - Kern, 1976);

- the development of skills in using television as part of Open University studies (D302 - Gallagher, 1977a D101 - Morgan 1978b);

- the use of television for presenting case-study material (E221 - Gallagher, 1977b; D282 - Brahmawong and Bates, 1977; T101 - Brown, 1981);

- the effect of co-production on the learning effectiveness of programmes for OU students (S354 - Marcus, 1980a)

With regard to radio, studies have been made on:

- the use of radio to elaborate or discuss material in a television programme (E221 - Gallagher, 1975b; T101 - Brown, 1981);

- the use of dramatisation to illustrate the role of human factors in, and the complex nature of, decision-making (E221 - Gallagher, 1975c);

- the use of student discussions, to encourage students to make their own interpretations of novels (A302 - Koumi, 1975);

- the use of radio-vision (radio programme combined with a stereo slide viewer, rock samples and specially prepared printed material) (S333 - Berrigan, 1977).

It would need another article to deal fully with the question of the teaching roles of television and radio in the Open University. It is though of relevance to the theme of student learning that an analysis of the programme and other course material for those programmes that we studied showed that in general, the programmes were providing knowledge or developing skills in ways that were not found elsewhere in the course.

However, at the same time, the fact that the programmes were being used in this way did not itself guarantee that the required learning would take place. For nearly every different teaching function examined, we have found examples where the strategy of using television or radio in that way has been both successful and unsuccessful. In other words, there are other conditions which have to be met as well.

To provide examples of this, I will choose two very different kinds of programmes, television case-studies, and programmes which aim to reinforce concepts taught elsewhere in the course.

Case-Studies and Documentaries

The use of television to provide case-study material is very widespread in the Open University. We have made several detailed studies of such programmes. A full summary of results, a critique, and advice to academics involved in such programmes, can be found in Bates and Gallagher (1977). There is also an excellent discussion of this kind of Open University programming by Grahame Thompson of the University's Social Science Faculty (Thompson, 1979). The main results we found were as follows:

1. The functions of the programmes in terms of the skills required of students, and the way content was treated, were quite different from those of the correspondence texts. The correspondence texts were theoretical, analytical and didactic. The television programmes dealt with concrete situations, presented "images" of complex, real-world situations, and were open-ended, open to interpretation, and non-analytical. Producers and academics expected students to analyse the television material, using the theoretical or analytic constructs provided in the correspondence texts; to apply what they had learned in the texts to the real-world situations observed in the television programmes; to generalise or draw conclusions from the specific instances in the programmes; to test, evaluate, or compare the applicability of general principles in the text to the "real-world" instances found in the television programmes.

2. In several instances, the programmes were the only place in the course where students were able to develop or practice these kinds of learning skills, other than in answering assignment or examination questions. (In some cases, "readers" - collections of papers - or written case-studies provided a similar opportunity).

3. Academics and producers in most cases agreed on the relevance of the programmes to the course - they saw a congruence between the content of the programmes and the content of the correspondence texts, although the treatment of content and the choice of examples were different.

4. For some of the programmes investigated, a majority of the students did not think that the programmes were very relevant or helpful ("I learned nothing new from this.")

5. For most of the programmes investigated, a large minority (about a third) of students misunderstood the purpose or function of the programmes - they were looking to the programmes to provide new content, or explanation of difficulties encountered in the correspondence texts.

6. Less than one-third of students, for any programme, both understood the purpose of such programmes and appeared able to use the programme material in the ways suggested in (1) above. One-third of students on average did understand the purpose of such programmes, but appeared unable to use the programme material in the way intended.

7. A majority of students wanted more help in using such programmes.

It seems clear from these particular kinds of programmes that television is being used to encourage high-level mental skills (high-level, in the sense that they depend on the development of other learning skills, before they can be used - see Bloom, 1956 or Gagné 1970). It is also clear that many students, even at third level, with many OU courses behind them, find it difficult to use television in this way. Students' expectations of the role of media such as television are also different - they tend to judge programme material by the extent to which it adds new knowledge or explains knowledge inadequately dealt with in the texts; not by the extent to which it enables them to use the knowledge gained in texts.

Some useful lessons have been learned from the research. On one course (D302) a programme (TV2) was made which showed students how they were expected to approach a previously viewed documentary programme. After seeing the second programme (which was one of the most highly rated programmes we have evaluated at the OU), students' appreciation of the first programme increased considerably, and, more significantly, a further third of the students were able to use the first programme's material in the way intended (Gallagher 1977a). The BBC, RTS, and IET have now jointly designed a new package, called "Learning from Television" aimed at new foundation course students and tutors, which provides examples of different uses of television and suggestions on how best to approach such material. Lastly, the new Social Science foundation course (D102), due to appear in 1982, is deliberately structuring its programmes in order to develop students' skills in using television in various ways.

The implication is quite clear. Students do not automatically know how to use instructional television to best advantage. The further a programme moves away from overtly didactic teaching, the more help students need to develop the necessary skills to beenfit from such programmes.

Television as Reinforcement

In contrast to case-study programmes, D102, TV7 was intended to directly reinforce a section of the Unit 7 correspondence text. Thus both the programmes and the text dealt directly with "Hockett's Design Features". Both the producer and the academic responsible for the unit believed that a full understanding of the 16 design features described in the text required both vision and motion to show the concepts in action. A feature of the programme was the participative exercises, where six different film sequences illustrating instances of communication between animals or humans were shown to the students, who were asked to select during the programme the correct design feature which each sequence illustrated. An evaluation of the programme by Kern (1976a) showed that the programme was very highly rated by the students, who found the programme helpful and interesting. A majority of students stated that the programme gave them a better understanding of the 16 features.

S333, TV3 had similar aims of reinforcement of material covered elsewhere in the course. Two sections in the Techniques Handbook which were considered essential but difficult were also covered in the television programme. Although an evaluation (Berrigan, 1977) showed that generally students reacted favourably to the programme, a higher proportion of students (about one-

third in all) was dissatisfied with the programme than was the case with D101, TV7. There were several reasons for this. The main student criticism of S333 TV3 was that the programme did not deal adequately with the difficulties encountered in the Techniques Handbook. The two sections specifically dealt with were not treated in sufficient depth to help students who had found difficulties with these sections; other sections in the Handbook which caused some students more difficulty were not dealt with at all. While D101, TV7 had been tried out in advance on a small group of students to get the pace right, no attempt was made on S333 TV3 to ascertain exactly what the difficulties were, and how best to treat them.

The general point underlying the research into the use of television both for case-studies and for direct reinforcement of textual material is that both uses of the medium can be valuable but the necessary conditions for success have to be met. I shall therefore in the rest of this paper try to identify what these main conditions are, and how they affect learning from audio-visual media.

Delivery

The first condition that has to be met in a distance learning system is the delivery of material. In the Open University this is a particular problem for television and radio. In 1974, when all courses had repeats, and at least one transmission at times which the students themselves rated as convenient, the mean viewing rate across all programmes and courses was 64%. This can be interpreted in one of two ways: any individual student was likely to watch almost two-thirds of the programmes on his course; or any individual programme was likely to be seen by almost two-thirds of the students on that course (Bates 1975a). This though is an average figure covering the whole year. Viewing drops off considerably during the summer period, due to holidays and summer schools, and at the end of the academic year, as students concentrate more on revision for exams (Bates, 1975a), so up to about July, viewing figures for most programmes were averaging between 75% - 80% in 1974.

Five years later, the average viewing figure was 55%, a drop of over 8%, (Grundin, 1980). Nor was this drop evenly spread between the faculties. Science courses (which in 1974 had the highest average viewing figures) dropped 13%, whereas Mathematics courses (which had the lowest viewing rates in 1974) hardly dropped at all. Close examination of the data shows that the drop in viewing rates can almost all be explained in terms of

deteriorating transmission times, for two reasons. The same courses surveyed in 1974 or 1976 and then again in 1979 (and there were 26 such courses) had dropped their viewing rate by an average of 11% although the course and its programmes were the same. Secondly, new courses in their first year of presentation, even in 1979, were given generally good viewing times and maintained on average good viewing figures in that first year of presentation.

The deterioration in transmission times is due to two factors. The first is the gradual deterioration in the overall mean "quality" of transmission time - more times being used which are less convenient to students. The second is the removal of repeat transmissions, which reduces the choice students have of times at which to watch.

Furthermore, the situation will deteriorate even further in 1982, when evening transmissions are lost. Our predictions (which have been extremely accurate over the last five years) are that the mean viewing rate will drop below 50% in 1982 (although the proposed VCR scheme may just keep it at around 50%). If the average viewing opportunity in 1982 was the same as in 1974, there would be 180,000 more student viewings of OU television programmes than what we predict will occur in 1982. This is a tremendous loss of viewing. If students do not see programmes, they cannot learn from them. No single factor can have had a greater impact on student learning from television than this loss of viewing.

If the mean quality of transmission time cannot be maintained, effective learning from television for the majority of Open University students can be achieved only by drastically reducing the number of programmes for transmission (to give more repeats), or by finding additional means of viewing (such as through a video cassette scheme).

While the transmission problem is very serious, it needs to be kept in proportion. Many courses will continue to receive good transmission times on a Saturday or Sunday, and even in 1982, many programmes will still be repeated or also available on cassette. So what can be done to ensure that students who are able to watch or listen can learn effectively from them?

Students' Prior Experience of Learning from Television and Radio

When a student begins studying at the Open University, he or she is not a tabula rasa. Students already have experience of television and radio. Brown (1980) carried out a study of new students' attitudes to radio, comparing their attitudes before beginning to study OU foundation courses

with their attitudes after completing their foundation courses. Brown found that there were marked differences between students in their experience of general service radio broadcasting. Students registered for the Arts Faculty were more likely to hear regularly a wide range of programme formats including talks, drama and documentaries. Students registered for the foundation course in Mathematics, Science, and Technology spent more of their listening tuned to BBC Radio 1 and BBC Radio 2, whose output is predominantly music and magazine programmes.

This suggested that students registering for the different introductory courses tended to use radio in different ways. This conclusion was supported by the response to a question which asked students how frequently they listened to a range of programme types. These data showed that Mathematics, Science, and Technology students begin their foundation courses with a much more limited experience of radio than do Arts, and to a lesser extent Social Science students. All groups regularly used radio for news bulletins and music but other programme formats, such as documentaries, talks, and plays are less commonly experienced by the students registering for Mathematics, Science and Technology.

The possibility that their day to day use of radio before joining the Open University may have been poor preparation for their use of radio as a learning resource was reinforced when students were asked whether they ever listened to radio without doing something else at the same time. Approximately half the student sample said they NEVER listened to the radio without doing something else. Clearly, using news bulletins and music as a background to other activities is unlikely to help students develop the ability to learn from radio when it is used as part of a University course.

Data from the second questionnaire showed clearly that Foundation Course radio had been used most heavily by Arts Faculty students, though comparatively few students on other foundation courses - with the exception of those taking the Mathematics course - had not heard at least some of the programmes. An analysis of the criteria used by students to gauge the value of radio suggested that at least part of the explanation for the greater use of radio by Arts students was that they were far more willing than those in other courses to see radio used to broaden the course and provide new perspectives on the subject matter. In other courses the majority of students had much narrower views of radio's role. They saw it as explaining and supporting the content of the correspondence texts using the same perspective and approach adopted in those texts. The attitudes to radio of M101 students contrast strongly with their attitudes to television or

books. Morgan (1978) asked M101 students about which medium they felt most comfortable with: M101 students ranked themselves most clearly as "book" people, followed by conversation, television, newspaper, radio and film, in that order. It is not so surprising then that on M101, 28% of students never listen to any M101 radio programmes, compared with only 2% who never see any M101 TV programmes (Grundin, 1979).

The implication of this research combined with the research reported earlier on the use of television for case-study, documentary-type programmes, is obvious. It cannot be assumed that all students bring with them the necessary skills for learning effectively from television or radio. However, at least with television, students are initially willing to watch. Radio provides a formidable challenge to Maths, Science and Technology courses. If it is to be used, not only must students be helped, but the value of its role must be clearly understood by students, even before they start studying. This suggests that a radical change in the current use of radio in these faculties at foundation level is required - or alternatively a major effort needs to be mounted to explain to such students why the use of a medium to broaden a course and to provide new perspectives on subject matter is a valuable part of a University education. It will also probably be necessary for the value of such a role to be recognised in assessment policy.

Student Control over Audio-Visual Media

A major difficulty that students face that applies only to broadcast television and radio and not to printed material is the lack of student control over access and use of broadcast material. These difficulties can be overcome, of course, by the use of cassettes or discs (audio or video), but for most courses being produced over the next few years the University will still need to rely heavily on broadcasting, at least for television. It is worth then comparing in some detail the different implications for learning of broadcast and recorded material.

a. Broadcasts. Table 1 (over) lists the control features associated with broadcasts, and the implications for learners:

Table 1: Control Characteristics of Broadcasts

Broadcast Characteristic	Learner Implications
Fixed schedules	Fixed time to view
Scarcity of time (hence only one or two transmissions)	Limited response to material
Ephemeral	Non-repeatable; non-retrievable (except by memory)
Continuous	Thinking "on-the-run"
Holistic (i.e. a single unit)	Reflexion, analysis, restructuring, relating to other materials, all difficult
Aimed at "average" target viewer	No room for individual differences in pace
"Rich" in meaning	Interpretable in different ways and at different levels - but only a limited range of interpretation permissable in time available for any one student

Some of the implications for learners in Table 1 are obvious, but some need comment. Because it is necessary to watch or listen at fixed times, and because it is not possible to stop or interrupt a broadcast at a specific point, it is more difficult for the learner to integrate or relate broadcast materials to other learning. If ideas or thoughts are stimulated during a programme, the learner runs the risk of either losing the thread of the programme, or the thread of his or her ideas, unless there is a mental capacity for doing both simultaneously. (If there is such a mental capacity, it probably needs training for it to be effective).

Some producers at the OU have argued that broadcasting teaches learners to think "on the run", and that this is an essential everyday skill. We have found little evidence though to show that experienced OU students are any better at this than new students. On the contrary, several of the studies have indicated a rapid "forgetting" of earlier parts of the programme as the programme progresses (e.g. Bates, 1975b).

Radio material can be retrieved to some extent by notes, which use the same verbal coding system as the medium in which the information is transmitted. With television, however, visual information in particular is difficult to code in note form, since with note-taking, the coding of the overall "meaning" of the total experience is done verbally. Our research (e.g. Gallagher, 1975b; Gallagher, 1977b; Kern, 1977a) has shown that most students find it impossible to take notes while viewing, and those that do are usually very dissatisfied with their notes.

No matter what the level of programme, the very nature of broadcasting means that the target audience will vary considerably in language skills and general ability. Programme makers have to make assumptions about the "appropriate" level, but there will always be a majority of the target audience who will not find the pace suitable, in terms of strict learning goals. The continuous and fixed pace of a programme does not allow for individuals to re-work or "jump" in their thinking to the level which best suits them.

However, this must be balanced against the "richness" of television in conveying a wide range of meaning within the same programme. As Salomon (1979) has pointed out, television combines several different symbol systems, allowing for wide variations in interpretation of meaning. This in turn permits students of differing levels of ability and background to abstract different levels of meaning. (We shall see later - under "Individual Differences" - that this frequently leads less able students to underestimate the "difficulty" of programmes). However, the richness of the material makes it all the more important for students to have the opportunity to explore more fully the content than is possible with a single, unbroken transmission.

b. Recorded material. Table 2 lists (over) the control features associated with recorded television, and the implications for learners.

Table 2: Control Characteristics of Recorded Material (Cassettes)

Recorder Characteristics	Learner Implications
Available when required	Convenient
Rewind/fast forward facility	Repetition; mastery learning
Stop-start facility	Integration with other media; activities integrated with cassettes; more room for individual variation
Non-continuous/Segmented	Reflexion, analysis, restructuring easier

The advantages to learners of recorded material over broadcast material are well-known, and generally need little elaboration. It is possible, if learners have the time, and the level of the material is not too wide of the mark, for learners with a wide range of abilities to repeat the material until they have mastery of it. Course designers can integrate recorded material more closely with other learning materials, so learners can move between different media as and when required. More importantly, learners can control their learning, so that they can reflect on the material, analyse or restructure it, as best suits them. Recorded material therefore considerably increases the control of the learner (and the teacher) over the way audio-visual media can be used for learning purposes.

The research clearly shows the advantage of moving broadcasts into a recorded form. Grundin (1978) found that the average helpfulness rating for radio programmes recorded on audio-cassettes was over 50 per cent, that is, more than twice as high as the rating of the same programmes when they were broadcast (25%). Since over 87% of undergraduate students have access to equipment for audio-cassette playback (Grundin 1980) and since the University provides a free library service for students who want cassette recordings of OU radio programmes, much more could be done to encourage students from the outset to use recordings of existing radio programmes.

However, a radio programme still tends to be of a continuous nature, and is less easily linked directly to other course components in design, than programmes designed from the outset for cassette use. Cassettes can be as long or as short as the course team wants, and can make extensive use of

the stop/start facility, and the opportunity to look and listen at the same time. Thus the student can be encouraged to interact with print or other visual material. Cassettes can be used to talk students through difficult materials - diagrams, formulae, exercises, etc., - often in a way similar to programmed learning, but in a much more personal and informal manner. Cassettes can be tightly integrated with the correspondence texts, enabling students to switch from one medium to another, or to use both simultaneously. Durbridge (1981) has commented on the "informal", "familiar" nature of presentation on cassette compared with radio.

Durbridge (1980a; 1980b) has carried out several studies of students' use of specially designed audio-cassette material, and from these studies, has produced a cassette-vision package setting out good and bad practice in cassette design, using examples from Open University courses.

The extra student control that cassettes have brought to audio material is also possible in theory for television. However, in practice, the University will be able to rely less on video-recording (either on cassette or disc) than audio recording, even for most new courses, over the next few years. There are several reasons for this.

First of all, a video-cassette system is much more expensive for the University to operate than an audio-cassette system. Costs are several times higher for video-cassettes, and currently, only 12% of students have access to a video recorder. The scheme being introduced in 1982 will cover only 23 out of the University's 140 courses, and even with expansion, it is unlikely, on grounds of cost, to replace completely broadcast television on many courses. Those students without their own machines will have to use machines at local centres or in other students' homes. Thus there will be less opportunity for intensive individual use, as with audio cassettes.

However, much more could be done with <u>broadcast</u> television to increase learners' control over the material. The use of activities built into the programme was very popular and successful with D101, TV7 (Kern, 1976a). Such a use of television - to teach classification - of course is often not appropriate, but more could be done than at present to repeat short sections of programmes so that students have the opportunity to analyse and think about the material, to build in direct links (in the commentary) to other components, to assist with analysis and interpretation <u>during</u> a programme, and to edit material in such a way that the meaning is not

buried in a series of apparently disconnected events (see Bates and Gallagher, 1977, for more discussion of this approach). Both Gallagher (1978) and Thompson (1979) have argued that the Open University has not developed a new style of broadcasting unique to its own situation, but has adopted the form and styles of conventional broadcasting. It will be interesting to see whether D102 achieves a new style of broadcasting which combines both "good" television practice and provides more support for students in learning from television.

"Relevance"

One of the main reasons given by students for not watching or listening to Open University broadcasts - or not treating them seriously - is their perceived lack of "relevance". There are two main reasons why programmes are not perceived as relevant by students. In one case, the programmes are relevant, but students do not have sufficient information or skills to see the relevance of the programme material. In the other, the material is not relevant, in that, with the best will in the world, even the course team would find it difficult to make links between the television programme and the rest of the course.

I shall not deal with the latter case. In none of our evaluations have we so far come across programmes that were not relevant to the main aims and objectives of the course. The question then is even more curious: why do so many students so often perceive programmes to be irrelevant? For instance, Brown (1981), in his evaluation of T101 broadcasts, found that although students often learned what the course teams wanted them to learn from the programmes, they were not only unable to see the relevance or significance of the programmes, but they were also unaware that they had learned something important from the programmes. This would not matter, of course, if it had not influenced their viewing behaviour. However, unfortunately, after a good start, viewing figures by the end of the year were lower on T101 than on most other foundation courses. Lack of relevance was one of the main reasons given by students for non-viewing.

Perceived relevance is a complex phenomenon. It seems to be influenced by several different factors: assessment policy; overt integration of broadcasts with texts; timing of broadcasts in relation to study of other components; scheduling of print and broadcast productions; and choice of inappropriate programme material. I will deal with each of these in turn.

(a) Assessment Policy. Anything included in a course by a course team - including the programmes - might be considered relevant by definition. However, students have a very instrumental approach to studying at the Open University. Time is a precious commodity, so for many, their main criterion for judging relevance is: will it help me get better grades? Put at its crudest, this can be rephrased as: can I get good marks on assignment and examination questions without watching or listening to the broadcasts?

This presents a problem for the broadcasts. With transmission times getting more difficult, course teams are not allowed to set questions which can be answered only if students have seen or heard a programme, unless an alternative question is set. One study (Gallagher, 1977b) showed that only one-fifth of the students attempted a broadcast-related question (although 85% of students saw the programme), and the average grades awarded for the broadcast-related assignment was below that for the alternative assignment questions. There is evidence that deliberately setting CMA questions which can only be answered through watching the programmes does improve helpfulness, relevance and viewing figures (Bates, 1973; Bates, 1975a; Kern, 1977b) but also increases student resentment and can lead to trivial questions, or questions which do not really test the essential audio-visual component of the programmes (Bates, 1973; Kern, 1977b). Also if the role of media is to present (the same) knowledge in new ways, or to develop certain skills, such an approach seems to be the wrong way to tackle the problem. Thus overtly setting assignments on broadcasts may improve the perceived relevance of programmes, but possibly at the expense of a sensible assessment strategy, and may disadvantage students unnecessarily (see Kern, 1976b and Bates, 1975c for a full discussion of this issue).

The main difficulty appears to be how to help students see the relevance of material and approaches contained in the broadcasts, and to draw on this - and other - material when tackling assignments. They key to this lies in the integration between text and programme material (see over), but one factor which would help would be a clear recognition and identification of the skills which are specifically intended to be developed through broadcasts (if any) For instance, given that the intention of many of the case-study programmes we have analysed has been to develop skills of analysis, application, generalisation, synthesis, etc., it would seem perfectly valid to set assignment questions which deliberately attempted to test these skills. If students are clear at the beginning of the course

that this is one of the roles for broadcasting, they might see the relevance of the programmes in a different light. It might also be noted that a fair test of the development of such skills might be a request to students to analyse a short programme segment - on video cassette - under examination conditions (e.g. "Explain the situation portrayed in the programme segment in terms of the main principles covered in the correspondence texts"). In order to be able to do this however, course teams must be clear about what skills they intend television, radio or cassettes to develop, as distinct from the texts, and these intentions must be successfully communicated to students through the programmes themselves.

(b) Integration of broadcasts with texts. A main difficulty for many students is the lack of explicit links between the programmes and the correspondence texts. It is the exception rather than the rule to get references to television or radio programmes in the text - and even rarer to get in the text any form of analysis or discussion of programme material. Conversely, it is rare for programmes to refer explicitly to sections of thetext. (This is often due to the different production schedules for text and broadcasts - see below). Frequently, the bridge between text and programme is made through the broadcast notes, and it is not surprising then that on many courses, the broadcast notes are rated more helpful than the programmes themselves. It is clear from many of the studies (e.g. Gallagher, 1975,b; Gallagher, 1975c; Gallagher, 1977,b; Brahmawong and Bates, 1977; Brown, 1981) that students find it very difficult to make the connection between television or radio programmes and the text, even though a great deal of help may be given in the broadcast notes. The success of M101 in particular, where texts and broadcasts have been tightly integrated, and of audio-cassettes, where again the links between texts and programmes are explicit, indicates the importance to students of explicit links contained in both programmes and text. The need for these explicit links is not because students are stupid or lazy. In discussion with producers and academics, we have found that it is often extremely difficult for them to explain the conceptual relationship between programme and text. For students to do this without guidance, a full understanding of the subject area, and high -level skills, are required. There will always be some who can do this but there will be many others who cannot, unless helped.

(c) Timing of broadcasts in relation to other components. Some of the earlier studies carried out by the AVMRC and colleagues (Ahrens, Burt and Gallagher, 1975; Bates, 1975b; Gallagher, 1975b) indicated that most students were usually studying the texts at least two or three weeks behind schedule.

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which meant that broadcasts were often watched or listened to before students had covered those parts of the correspondence texts to which programmes were linked (or were missed altogether, because students were trying to catch up). These studies also established that students' work patterns were determined manily by the TMA cut-off dates rather than by the timing of the broadcasts. This meant that programmes were often seen considerably out of synchronisation with study of the textual material, and this obviously affected the perceived relevance and helpfulness of the programmes. A number of suggestions were made - that programmes should be introductory rather than depend on prior reading of the texts, or that repeats should be shown three weeks after transmission etc.

However, rather than accept these compromises on integration, the M101 course team took the bull by the horns, and structured the television, radio and audio-cassette material so tightly with the text that great pressure was put on the students to work to schedule on all components. There were sections in the text which directed students to watch or listen to programmes, then carry out work (in the text itself) based on the programmes.

This strategy was highly successful. A study by Womphrey (1978), showed that over 75% of responding M101 students kept up with or in advance of the television pacing, and of those who were behind the TV pacing, half were less than one week behind. The M101 viewing rate was 78% (compared with 63% for M100), and the helpfulness ratings for M101 were much higher than for M100, and the second highest in the faculty.

It is an example where close integration of programmes and text overcame the scheduling problem and increased the relevance of at least the television programmes.

(d) Scheduling of print and programme production. To obtain such close integration between text and programmes, the schedule of print and programme production has to be carefully synchronised, so that programme scripting, editing and commentary can take account of draft texts, and final drafts of texts can take account of programme material. In practice, however, it has often proved extremely difficult to obtain such close synchronisation of production schedules. Some course teams have not had producers available or assigned in time. On other course teams, key academics have not been available - or their draft texts have not been written - when programmes were to be scripted or edited. On some course teams, no attempt has been made to synchronise broadcast and text production, because, due to prior

staff commitments, they were on different time schedules from the beginning.

Lack of synchronisation in production is probably the main reason why it is difficult to make explicit links between programmes and texts. I do not wish to minimise the difficulties of two large and complex organisations, both with highly individual and creative staff, achieving such detailed synchronisation of activities. The will is usually there, but practical difficulties often render synchronisation impossible. Even then, as I have previously noted, programmes are usually relevant to the aims and goals of the course. However, when students need to make conceptual leaps to link programme material with texts, with little help other than from broadcast notes, there is often a major loss of learning from the programmes. In such cases, the programmes are wrongly seen by students as irrelevant, and hence dispensable.

(d) Inappropriate programme material. Although it was not a frequently occuring event in our evaluations, the choice of material which was visually interesting or attractive, but not directly relevant to the aims or purposes of the programme, sometimes drew vehement criticism from students. For instance, in S333, TV3, (Berrigan, 1976) students found a section which showed a volcano erupting extremely irritating, as it threw no light on the topics under discussion, and seemed to have been included at the expense of some of the more relevant and difficult aspects of the topics under consideration. However, it must be said that this appears to be a relatively infrequent and minor factor affecting students' judgement of relevance. Much more important are the structural relationships between texts and programmes.

Individual Differences

The last major factor which appears to affect learning from audio-visual media is individual student differences. Students appear to differ greatly in their interest in, or ability to learn from, different media. I have already discussed earlier student attitudes to learning from different media even before they begin their studies. Students' response to Open University radio in particular is extremely varied. Whereas most students on most courses do seem to make an effort to watch the majority of television programmes, there is no coherent pattern for radio. Some students listen to none. Others listen to them all. Some listen to half. Students are equally distributed in their radio listening pattern (Bates, 1975a). I can only interpret this as an indication of strong individual preferences for learning from specific media.

There seems to be three conclusions one can draw. Although radio may not be used a great deal by a lot of students, those students who do use it regularly find it extremely valuable. (This is supported by Durbridge's study (1980a) of the use of radio on S101). Secondly, given such wide individual differences in media preferences, it is important to provide a wide range of media for students. In this way, each student is likely to find at least one means of acquiring knowledge with which he or she is comfortable. Some redundancy in media provision may therefore be necessary, if dropout is to be kept down. Thirdly, it may be important to try and help students to make more use of less preferred media, through training and help within courses themselves.

One very important difference was noted in three different large scale broadcast surveys (Bates, 1975a; Gallagher, 1977c; Grundin, 1978). In all these surveys, there was a greater tendency for students who passed their exams to make use of broadcasts more than students who dropped out or failed their exam; and students with grades A or B watched or listened more to OU programmes than students with pass grades C or D. These results are not surprising, and are probably more to do with students' motivation and workload, although it is clear evidence that the broadcasts do not have negative effects. What is particularly significant however, is that the weaker students who do watch or listen rate the broadcasts as more helpful than do the more successful students, and this trend is consistent from fail up to A/B - a trend opposite to that for correspondence texts.

Having examined other possible explanations, Grundin concludes:

> "It is possible though that brodcasts in many courses are genuinely more helpful for weak students than for more successful students. Since weak students tend to find the correspondence texts difficult and less helpful (than strong students), these students would seem to need more help from other components."
>
> Grundin, 1977,c, p.24.

It therefore seems that students who are satisfied with the texts will find the programmes less helpful, since they do not need further explanation. Note how closely these conclusions support Salomon's theory of the differential effects of learning through media (p). Note also the danger of concluding that audio-visual media are not necessary because successful students do not need them.

There are a number of other important student differences identified by the research. Koumi (1975) found that there were students who preferred to learn through discussions, and other students who preferred to learn from experts "telling them", and this affected students' appreciation and approach to radio programmes. Gallagher (1977b) found three kinds of student "types" in response to open-ended documentary-style television programmes: those that wanted straight instruction ("didacticists"); those that appreciated the value of open-ended programmes, but wanted more help ("guidance-seekers"); and those that were happy with open-ended programmes ("explorers").

Again, it would seem important to find ways of helping students to broaden their learning styles, through help in the programmes themselves, so that their approach to learning matches the task.

Broadcast Notes

Lastly, a great deal of research has been done on broadcast notes (see particularly Kern, 1976c). It can be seen that unless programmes are tightly integrated with texts, as in M101, courses will usually need some form of broadcast notes. T101 in its first year of presentation tried to avoid broadcast notes, first of all by attempting to get the texts to comment on the programmes. When, due to scheduling difficulties, this proved to be impossible, a two-minute prologue was used to introduce each programme and relate it to the texts. This apparently was not a good substitute for broadcast notes, as students found it difficult to remember the points made in the prologue when watching the rest of the programme, and afterwards, they had no permanent record of the programme (Brown, 1981).

Students rarely read broadcast notes in detail before a broadcast, so any pre-reading should be kept to a minimum - usually a statement of objectives, and two or three main points to watch out for during the programme. Students do find a brief resumé of the main points of the programme, and diagrams or tables shown in the programme useful for revision purposes. If a lot of detail is provided, though, students will either not read the notes, or will read the notes, but not bother to watch or listen to the programme. The main follow-up activity that students will do after a programme is further reading - and only about a half at a maximum will do this. If follow-up activities are important, they are better incorporated in the main text, or included in cassette activities. The most common mistake with broadcast notes is to entrust them with the main task of detailed integration of the programme with the text. Some broadcast notes are over 40 pages long, and there is no way students can cope with that extent of verbal explanation of

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and guidance on audio-visual media (see Gallagher, 1977b). The AVMRG has produced a package on the design of broadcast notes.

In Conclusion

I have tried to cover a large body of research on student learning from audio-visual media at the Open University. I have not been able to discuss methodology at all. However, it is not generally appreciated that much of our research into individual programmes (as distinct from the University-wide broadcast surveys) does try to measure exactly what students have learned from the programmes, and how they have integrated this with their other learning, and is not just based on students' own ratings of programmes. Although the research does indicate a number of major difficulties that course designers face in getting students to learn from audio-visual media, I hope I have been able to show that the research does support the view that radio and audio-cassettes do have unique roles to play in student learning at the Open University, and that it is worth the effort to ensure that this potential is actually achieved.

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